

# PREVENTING COLD-RELATED MORBIDITY AND MORTALITY IN A CHANGING CLIMATE

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**Background and Aims:** Overall, higher death rates are observed in winter months compared to summer months. General circulation models used in climate change research indicate a trend towards more intense winter storms occurring in the Northern Hemisphere, particularly between northwestern Europe and the Upper Midwest and Northeast of the United States. To understand current efforts to reduce risk during cold weather, epidemiological, and adaptive behaviour research is compiled and presented.

**Methods:** We critically reviewed evidence relating temperature variability, health outcomes, and adaptation strategies to cold weather. Health outcomes included cardiovascular-, respiratory-, cerebrovascular-, and all-cause morbidity and mortality. Population and geographic-specific studies were assessed to highlight associations between individual- and neighborhood-level characteristics that contribute to one's vulnerability to cold weather. Adaptation strategies were evaluated at personal-, building-, and neighborhood scales.

**Results:** Cardiovascular-cause mortality was the most commonly identified health outcome associated with cold weather. Vulnerable populations include the elderly, populations living in typically mild winter climates, and rural populations. Successful adaptation to cold weather was found mostly at the personal level, yet building modifications such as insulation greatly improve thermal comfort of building inhabitants, suggesting that dwelling modifications could protect human health from cold weather.

## **Conclusions:**

Evidence suggests that variability in climate contributes to morbidity and mortality during winter. Results from this research justify the need for (i) immediate actions to promote an awareness among homeowners, property managers, and housing authorities of the importance of building integrity in protecting human health (ii) an allotment of resources for weatherization efforts and (iii) focused research to evaluate the impact of infrastructure-level adaptation to protect human health. We propose that future climate change adaptation research couple building energy and thermal comfort models with epidemiological data as a novel approach to evaluate and quantify the impacts of adaptation strategies.